

Comparative Analysis of the Item Difficulty Levels of Waec, Neco and Nabteb Mathematics Achievement Examinations

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Abstract

This study examined the item difficulty levels of WAEC, NECO and NABTEB Mathematics Achievement Examinations and compared same to ascertain the order of difficulty levels of mathematics achievement tests being constructed by these three examination bodies in Nigeria. Three homogenous groups of 200 students each were randomly selected from the Government Technical Colleges and the Senior Secondary Schools that were randomly selected from Ondo, Ekiti and Osun States of the South West Geopolitical Zone of Nigeria. The instrument consisted of adopted WASSCE, NECO and NABTEB Mathematics Examinations. Four hypotheses were raised and tested at $P=0.05$ and the results showed that there was no significant difference in the item difficulty levels of WAEC, NECO and NABTEB mathematics achievement examinations. Hence, it was recommended that none of this examination should be seen as being lower in standard than the other and there should be no discrimination in the recognition of WAEC, NECO and NABTEB certificates.

Keywords Comparative analysis, item difficulty, WAEC, NECO and NABTEB.

1. Introduction

West African Examination Councils (WAEC), National Examinations Council (NECO) and National Business and Technical Examination Board (NABTEB) are the three examining bodies, saddled with the responsibilities of conducting final assessment and evaluation of the final year students in the Technical Colleges and senior Secondary Schools in Nigeria.

Assessment has been considered to be integral part of the education system, be it Technical or Secondary Education. Bandele (2004), therefore emphasized that "for an assessment system to be valid, it has to be fair (and seem to be fair) to all examiners".

Reliable assessment tools should therefore produce dependable, repeatable and consistent information about people. Hence, a well standardized test should therefore not be too difficult or too simple. It should be able to discriminate effectively between the brilliant students. Nwaobia (1990) stated further that, item analysis (difficulty and discriminating indices) is concerned with ascertaining the worth of the test items.

Many people believed that NECO Examinations are the most difficult of the examinations being constructed by these examination bodies, while NABTEB examinations are considered as being inferior to WAEC and NECO Examinations. Adeniran (2000) also claimed that NECO is inferior to WAEC in all standard while Kolawole (2002) concluded that a given X grade in NECO mathematics test is equal to X + 1 grade in WAEC, meaning that WAEC is more difficult than NECO. Based on these, the researcher therefore, decided to examine and compare item difficulty indices of WAEC, NECO and NABTEB mathematics achievement examinations so as to be able to make appropriate conclusion and recommendations.

2. Statement of the Problem

The major problems of this study include the followings.

- How difficult are the items of the Examinations conducted by WAEC, NECO and NABTEB?
- Are the item difficulty levels of these Examinations comparable?
- Are these Examinations equivalently difficult?

3. Research Hypotheses

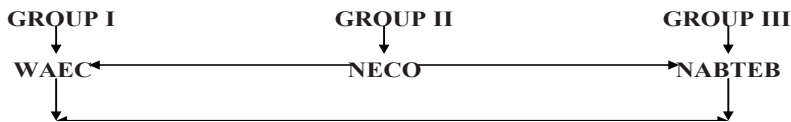
The following hypotheses were raised from the above stated problems and tested at 0.05 level of significance.

- Ho₁:** There is no significant difference between the item difficulty levels of NECO and NABTEB Mathematics Achievement Examinations.
- Ho₂:** There is no significant difference between the item difficulty levels of WAEC and NABTEB Mathematics Achievement Examinations.
- Ho₃:** There is no significant difference between the item difficulty levels of WAEC and NECO Mathematics Achievement Examinations.
- Ho₄:** There is no significant relationship in the item difficulty indices of WAEC, NECO and NABTEB Mathematics Achievement Examinations.

4. Research Design

This study is a descriptive research of the survey type that involved the use of a correlation design as shown below.

Table 1: A correlation design to elicit the item difficulty levels of WAEC, NECO and NABTEB Mathematics Achievement Examinations.



5. Population and Sample

The population consisted of all the final year students of the Government Technical Colleges and Senior Secondary Schools in Nigeria. A total of 600 students were selected using simple random sampling procedure as follows, 200 students from three selected Government Technical Colleges that were selected, using randomly (sampling) and the remaining 400 students from the selected Senior Secondary Schools in Ekiti, Ondo and Osun States of the South West geopolitical zone of Nigeria.

6. Instrument

The research instrument consisted of adopted WASSCE, May/June 2009, NECO, May/June 2009 and NABTEB May/June 2009 of 50 multiple choice items each. For NECO, Nos 1-50 items were used.

6.1 Administration of the Instrument

The 400 students selected from the Senior Secondary School were grouped into groups I and II of 200 students each while the 200 students selected from the Government Technical Colleges are in group III. WAEC, NECO and NABTEB Mathematics Achievement Examinations were administered on the students in Group I, Group II, and Group III respectively.

7. Data Analysis

T-test was used to test hypotheses one, two and three while analysis of variance (ANOVA) was used to test hypothesis four.

8. Results

Ho₁: Hypothesis one was tested by using t-test method and the result was as shown in table below.

Table 1: T-test table of the mean item difficulty levels of NECO and NABTEB

BODY	N	Mean	S.D	tcal	
NECO	50	0.19	0.09	0.75	1.658
NABTEB	50	0.28	0.12		

$\alpha=0.05$
 $df=98$

The result showed that T-test calculated was less than T-test table.

The hypothesis was therefore accepted hence, there was significant difference between the item difficulty levels of NECO and NABTEB Mathematics Achievement Examinations.

Ho₂: Hypothesis two was tested by using t-test method and the result was as shown in table 2.

Table 2. T-test table of the mean item difficulty levels of WAEC and NABTEB Mathematics Examination

Exam Body	N	Mean	S.D	df	tcal	T-table
WAEC	50	0.29	0.10	98	0.08	1.658
NABTEB	50	0.28	0.12			

$P < 0.05$

The result showed that t-test calculated of 0.08 was less than T-test table of 1.658 which led to the acceptance of the hypothesis. Hence, there was no significant difference between the mean item difficulty levels of WAEC and NABTEB Mathematics Achievement Examinations.

Ho₃: Hypothesis three was tested, using T-test method and the result was as shown in table 3.

Table 3: T-test table of the mean item difficulty levels of WAEC, and NECO Mathematics Achievement Examination

Exam Body	N	Mean	S.D	df	tcal	T-table
WAEC	50	0.29	0.10	98	5.36	1.658
NECO	50	0.19	0.9			

From the table, t-calculated was 5.26 while t-test was 1.658. The hypothesis is hereby rejected. Hence, there was a significant difference between the item difficulty levels of WAEC and NECO Mathematics Achievement Examinations.

Ho₄: Analysis of variance (ANOVA) was used to test hypothesis four and the result was as show in Table 4.

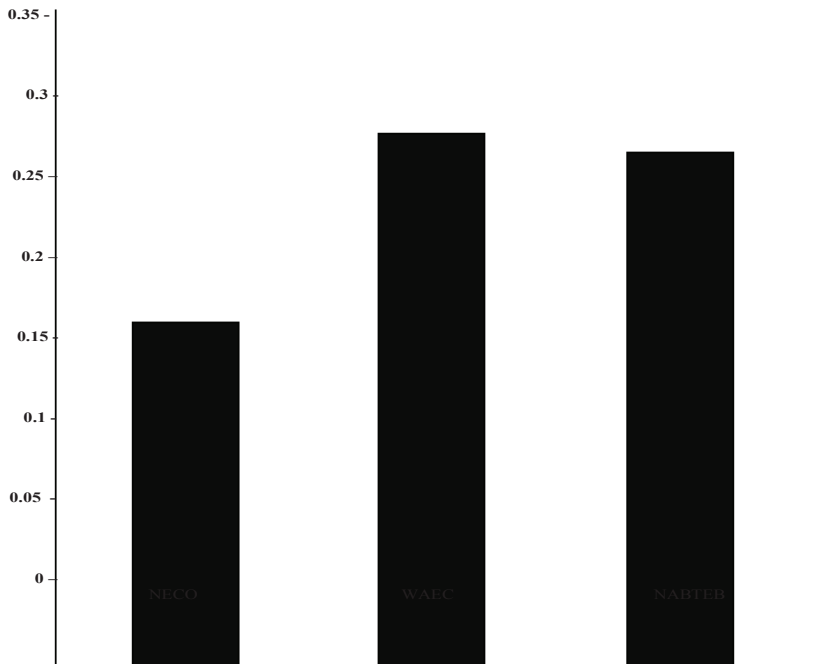
Table 4: ANOVA test of mean difficulty indices of WAEC, NECO and NABTEB Mathematics Examination

Variance	SS	df	Mss	f-cal	f-table	Significant
between	0.344	2	0.172	16.503	19.5	0.000
within	50	0.28	0.12			
Total	1.874	149				

$P \leq 0.05$

From the table, the result showed that F-calculated (16.503) was less than F-table (19.5), the hypothesis was therefore accepted. Hence, there was no significant difference in the mean item difficulty levels of WAEC, NECO and NABTEB Mathematics Achievement Examinations.

Fig II: Graph of item difficulty of WAEC, NECO and NABTEB Mathematics Achievement Examinations.



9. Discussion

Figure II clearly showed that NECO Examination is more difficult than WAEC and NABTEB while WAEC and NABTEB are almost equivalently difficult. The results of the test of hypothesis three also agreed with the graph by showing that there was a significant difference between the mean item difficult level of WAEC and NECO. The result hereby disagreed with Adeniran (2000) who claimed that NECO is inferior to WAEC in all standards. The result also disagreed with Kolawole (2002) who claimed that WAEC Examinations are difficult than NECO Examinations. Instead, NECO Examinations are more difficulty than WAEC. The graph also showed a difference between the mean item difficulty levels of NECO and NABTEB Examinations while the result of the test of hypothesis one also showed that the difference was significant, but the difference can still be ignored atimes since the mean item difficulty indices of the two lied on the same range (i.e between 0.2 and 0.3)..

The result of the test of hypothesis two showed that there was no significant difference between the mean item difficulty levels of WAEC and NABTEB which was also proved by the graph in fig. II and the comparison of the Examinations conducted by the three bodies as shown in the graph showed that there are difference in the mean difficulty levels but the result of the test of hypothesis four showed that there difference can also be ignored as the differences are not significant. The result also showed that none of these examinations is moderately difficult.

10. Conclusion and Recommendations

Based on the result of the findings, it was found that the three Examinations are comparable and that NECO Examinations are more difficult than that of WAEC and NABTEB, and that might have been one of the reasons for the recent mass failure in NECO Examinations.

The comparative analysis of the mean item difficulty levels therefore clarify the level of difficulty of the Examination conducted by the examination bodies. Hence, NECO produces the most difficult item tests, followed by NABTEB, while WAEC took the least position.

More importantly, since the differences in the difficulty levels are not significant as shown in hypothesis four, they are considered to be equivalent.

It is therefore recommended that none of these examination bodies should be seen as being inferior to the other, while (WAEC, NECO & NABTEB) should improve more on the item analysis of their test items.

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